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TOP SECRET [redacted] PRIORITY 25X1

P 311527Z
FM NPIC
TO AFSSO USAFE
AFSSO PACAF
CNO
[redacted]

1963 AUG 31 16 38Z 3 SEP 1963

OUT51771

25X1

OPCEN
YWQLAZC/AFSSO SAC
YWQLAZC/AFSSO ACIC
YWQLAZC/AFSSO FTD
YWQLAZC/AFSSO DIA PROD CENT
T O P S E C R E T [redacted] 25X1

[redacted] SSOS PASS TO APPROPRIATE 25X1

TCOS. CITE NPIC 1109.

THE FOLLOWING INFORMATION IS FROM THE NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER. SUBJECT: CAMERA INFORMATION FOR MISSION 1001-1.

A. THIS PHOTOGRAPHY INVOLVES THE USE OF EIGHT CAMERAS: TWO MAIN CAMERAS, FOUR HORIZON CAMERAS, STELLAR CAMERA AND AN INDEX CAMERA. (NOTE: STELLAR/INDEX DATA FOR 1001-2 INCLUDED).

B. OPERATIONAL FOCAL LENGTHS

	FWD UNIT	AFT UNIT
(1) MAIN LENS	609.120 MM	609.630 MM
(2) PORT HORIZON LENS	88.96 MM	89.12 MM
(3) STARBOARD HORIZON LENS	89.90 MM	89.10 MM

[redacted] 25X1 25X1

TOP SECRET [redacted]

GROUP 1
Excluded from automatic downgrading and declassification

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(4) STELLAR CAMERA (1) 83.84 MM (2) 83.67 MM

(5) INDEX CAMERA (1) 38.40 MM (2) 38.42 MM

DEFINITION: "OPERATIONAL FOCAL LENGTH" IS DEFINED AS THE DISTANCE FROM THE MAIN LENS NODAL POINT TO THE FILM SURFACE AS MEASURED ON THE LENS BENCH, AND THE DATA REDUCED FOR A FACUUM CONDITION. (OPERATIONAL FOCAL LENGTH IS EQUIVALENT FOCAL LENGTH CORRECTED FOR ENVIRONMENT.)

C. LENS DISTORTION (PIN CUSHION)

	FWD UNIT	AFT UNIT
(1) MAIN LENS		
3 DEGREES	.003 MM	.002 MM
2 DEGREES	.002 MM	.001 MM
1 DEGREES	.001 MM	.000 MM
0 DEGREE	.000 MM	.000 MM
359 DEGREES	NOT AVAILABLE	NOT AVAILABLE
358 DEGREES	NOT AVAILABLE	NOT AVAILABLE
357 DEGREES	NOT AVAILABLE	NOT AVAILABLE
(2) PORT HORIZON CAMERA		
(RADIAL DISTORTION)		
10 DEGREES	.021 MM	.003 MM

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20 DEGREES	.068 MM	.042 MM
(TANGENTIAL DISTORTION)		
MAXIMUM VECTOR	.009 MM	.009 MM

(3) STARBOARD HORIZON CAMERA

(RADIAL DISTORTION)		
10 DEGREES	.006 MM	.015 MM
20 DEGREES	.044 MM	.062 MM
(TANGENTIAL DISTORTION)		
MAXIMUM VECTOR	.006 MM	.000 MM

D. DEPRESSION ANGLES OF HORIZON CAMERAS RELATIVE TO NOMINAL MAIN CAMERA.

(1) FWD UNIT

A. PORT HORIZON CAMERA - 14 DEGREES 49° 04"

B. STARBOARD HORIZON CAMERA - 14 DEGREES 26° 23"

(2) AFT UNIT

A. PORT HORIZON CAMERA - 14 DEGREES 17° 55"

B. STARBOARD HORIZON CAMERA - 14 DEGREES 57° 04"

E. FILTER AND EXPOSURE DATA

(1) MAIN CAMERAS	FWD UNIT	AFT UNIT
FILTER	WRATTEN 21	WRATTEN 21
APERTURE	F 3.5	F 3.5

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SLIT WIDTH	.200 INCH	.200 INCH

(2) PORT AND STARBOARD HORIZON CAMERAS

FILTER	WRATTEN 25	WRATTEN 25
APERTURE	F 6.8	F 6.8
EXPOSURE	1/100 SEC	1/100 SEC

(3) STELLAR CAMERAS (1) AND (2)

FILTER	NONE
APERTURE	F 1.9
EXPOSURE	2 SEC

(4) INDEX CAMERAS (1) AND (2)

FILTER	WRATTEN 21
APERTURE	F 4.5
EXPOSURE	1/500 SEC

F. RESOLUTION CAPABILITIES

(1) MAIN LENS

A. FWD UNIT - 179.2 (L/MM AVG)

B. AFT UNIT - 191.2 (L/MM AVG)

(2) PORT HORIZON CAMERA

A. FWD UNIT - 35.8 (L/MM AVG)

B. AFT UNIT - 35.4 (L/MM AVG)

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(3) STARBOARD HORIZON CAMERA

A. FWD UNIT - 36.2 (L/MM AVG)

B. AFT UNIT - 37.6 (L/MM AVG)

(4) INDEX CAMERA (1) 81.46 (L/MM AWAR)

(5) INDEX CAMERA (2) 74.982 (L/MM AWAR)

G. TIMING MARKS

FREQUENCY MARKS WILL APPEAR ON THE FILM. RATE OF TIMING MARKS WILL BE 200 CYCLES PER SECOND.

H. FILM DATA

1. MAIN CAMERAS - SO 132

2. HORIZON CAMERAS - SO 132

3. STELLAR CAMERAS 1 AND 2 - SO 102

4. INDEX CAMERAS 1 AND 2 - SO 130

I. CALIBRATED ANGLES OF CAMERAS

1. CALIBRATED CONVERGENT ANGLE OF MAIN CAMERAS - 29 DEGREES 53.7 MINUTES

2. CALIBRATED ANGLE BETWEEN FRAMING AND STELLAR CAMERAS - NOT AVAILABLE

3. STELLAR - 1 (LOC. OF P.P.)

1. X EQUALS .000 MM

2. Y EQUALS MINUS .020 MM

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STELLAR - 2

1. X EQUALS PLUS .048 MM

2. Y EQUALS MINUS .064 MM

NOTE: VIEWING POSITIVE, EMULSION UP, COORDINATE SYSTEM IS DEFINED AS PLUS "Y" IN DIRECTION OF FLIGHT AND PLUS "X" TO THE LEFT AND PERPENDICULAR TO LINE OF FLIGHT.

4. INDEX - 1 (LOC. OF P.P.)

1. X EQUALS PLUS .014 MM

2. Y EQUALS PLUS .036 MM

INDEX - 2

1. X EQUALS MINUS .015 MM

2. Y EQUALS PLUS .021 MM

NOTE: VIEWING POSITIVE, EMULSION UP, PLUS "X" IS IN DIRECTION OF FLIGHT AND MINUS "Y" TO THE RIGHT AND PERPENDICULAR TO DIRECTION OF FLIGHT.

J. IMAGE MOTION COMPENSATION DATA

FMC PROGRAMMER REFERENCE LEVEL

(1) GROUND ANGULAR VELOCITY (RAD/SEC) .0301

PASSES: 1A1, 1A2, 1D1, 2A1, 3A1, 3D1, 3D2, 5D1, 6D1, 6D2

(2) GROUND ANGULAR VELOCITY (RAD/SEC) .0312

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PASSES: 7D1, 7D2, 8D1, 9D1, 9D2, 16A1, 17D1, 21D1, 22D1, 22D2, 22D3, 23D1, 24D1, 33A1, 33A2, 34A1, 36D1, 37D1, 38D1, 39D2, 40D1, 40D2, 44A1, 46A1, 48A1, 49D1, 50A1, 51A1, 52D1, 54D1, 55D1, 56D1, 64D1, 39D1

FMC PROGRAMMER AMPLITUDE LEVEL

GROUND ANGULAR VELOCITY (RAD/SEC) .0118

PASSES: USED FOR ALL PASSES

NOTE 1: SEE REMARKS (PARA L)

K. PROGRAM TIME DATA

PASS	CAMERA ON TIME (ZEBRA TIME)			PROGRAM ON TIME UP RAMP	PROGRAM DURATION
	DAY	HOUR	MIN	(SEC)	(SEC)
1A1	25	01	41	667	142
1A2	25	01	47	1001	153
1D1	25	01	53	1355	130
2A1	25	03	13	724	125
3A1	25	04	42	608	261
3D1	25	04	53	1298	153
3D2	25	04	58	1601	172
5D1	25	08	01	1708	244

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6D1	25	09	31	1718	170
6D2	25	09	36	2035	192
7D1	25	11	01	1630	120
7D2	25	11	04	1795	179
8D1	25	12	31	1730	222
9D1	25	14	03	1792	171
9D2	25	14	09	2171	100
16A1	26	00	21	861	143
17D1	26	02	04	1599	160
21D1	26	08	11	1886	120
22D1	26	09	36	1544	138
22D2	26	09	40	1811	203
22D3	26	09	44	2055	268
23D1	26	11	11	1881	138
24D1	26	12	45	1991	180
33A1	27	02	02	963	106
33A2	27	02	06	1200	131
34A1	27	03	32	931	159
36D1	27	06	53	2086	85
37D1	27	08	20	1880	136
38D1	27	09	51	1892	106
39D1	27	11	21	1853	139

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39D2	27	11	24	2033	133
40D1	27	12	51	1837	173
40D2	27	12	55	2080	147
44A1	27	18	41	1115	115
46A1	27	21	39	915	89
48A1	28	00	39	904	192
49D1	28	02	23	1691	159
50A1	28	03	40	845	292
51A1	28	05	16	1229	103
52D1	28	07	02	2115	117
54D1	28	10	01	2027	228
55D1	28	11	30	1897	265
56D1	28	13	00	1881	377
64D1	29	01	01	1684	112

NOTE 2: DATA IS THE SAME FOR BOTH THE MASTER AND SLAVE UNITS

L. REMARKS

THE RAMP FOR THIS MISSION IS A MODIFIED SINUSOIDAL CURVE OF 4800 SECONDS DURATION AND SYMMETRICAL ABOUT THE 2400 SECOND MARK. IN ORDER TO PLOT THIS CURVE WE MUST EQUATE THE 4800 SECONDS TO ITS EQUIVALENT IN DEGREES 210. THE CURVE REPRESENTS GROUND ANGULAR VELOCITY (RADIANS/SECONDS) VS TIME (DEGREES). THE CURVE IS MADE

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UP OF THREE SECTIONS EACH HAVING ITS UNIQUE EQUATION. FROM 0 DEGREES TO 60 DEGREES, THE EQUATION OF THE CURVE IS K SIN (THREE HALFS X - 90 DEGREES). THE SEGMENT FROM 60 DEGREES TO 150 DEGREES HAS THE EQUATION K SIN (2 X - 120 DEGREES) AND THE LAST SEGMENT FROM 150 DEGREES TO 210 DEGREES IS DEFINED BY K SIN (THREE HALFS X - 45 DEGREES). THE TWO VARIABLES X AND K ARE GIVEN. "X" IS THE TIME (DEGREES) OR SCALE ON THE ABSCISSA AND K IS GIVEN IN THIS CABLE AS A GROUND ANGULAR VELOCITY VALUE. THE ORDINATE OF THE GRAPH RANGES FROM THE "REFERENCE LEVEL" VALUE (GIVEN) IN GROUND ANGULAR VELOCITY (RADIANS/SECOND) TO PLUS AND MINUS THE K VALUE WHICH REPRESENTS THE AMPLITUDE OF THE CURVE. WITH THIS CURVE PLOTTED AND THE TIME UP THE RAMP PROVIDED FOR EACH PHOTOGRAPHIC OPERATION (PASS OR SEGMENTS THEREOF) THE CAMERA RATES FOR THAT PASS CAN BE FOUND. THE FOLLOWING CONVERSION FACTORS WILL ALLOW ONE TO GO FROM GROUND ANGULAR VELOCITY TO CYCLE PERIOD TO SCAN VELOCITYNTO IMAGE MOTITN COMPENSATION VELOCITY.

1. CYCLE PECIOD (SECONDS) EQUALS THE RECIPROCAL OF THE GROUND ANGULAR VELOCITY (RADIUS PER SECOND) (11.0574)

2. SCAN VELOCITY (INCHES VER SECOND) EQUALS (24) (6.2834) DIVIDED BY THE CYCLE PERIOD (SECONDS)

3. IMC VELOCITY ((8,:/SEC) CENTER OF FORMAT EQUALS 22.3921

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(GROUND ANGULAR VELOCITY RADXSEC);

M. TNME CORRELATION (READINGS IN MILLISECONDS)

PASS	SYSTEM TIME	CLOCK TIME	DIFFERENCE
09	49386.840	308451.664	
25	50067.848	395532.6[illegible]	PLUS .008
47	84752.940	516617.794	PLUS .022
56	45760.338	27154.282	PLUS .001

25X1

CAMERA ON TIME PASS	(ZEBRA TIME) DAY HOUR MIN	PROGRAM ON TIME UP RAMP (SEC)	PROGRAM DURATION (SEC)
11A	25 16 41	0	32
25A	26 13 53	680	48
41A	27 14 03	724	49
56A	28 12 42	769	49

FMC PROGRAMMER REFERENCE LEVEL

GROUND ANGULAR VELOCITY (RAD/SEC) .0312

PASSES: 11A, 25A, 41A, 56A

FMC PROGRAMMER AMPLITUDE LEVEL

GROUND ANGULAR VELOCITY (RAD/SEC) .0118

PASSES: 11A, 25A, 41A, 56A

1

T O P S E C R E T

25X1

END OF MESSAGE

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